Ueber den Hautsinn. De phil. et med. Max Dessoir. Du Bois-Reymond's Archiv f. Phys. 1892. Heft III. and IV. pp. 177-339.

In a theoretical introduction of seventy pages, the author discusses the concepts of sensation and perception, the qualities of sensation, associated and after-sensations, the law of specific energy, the objectification of perceptions, and the classification of perceptions. The theory of specific energy in the sense "dass ein und derselbe Reiz diese verschiedenen Wahrnehmungen hervorbringen köune und dass eine Mehrheit von Reizclassen * * * ein und dieselbe Wahrnehmungsart erzenge" is held to be false. (P. 245.) In the restricted sense that: "Eo kommt einem jeden Sinnesapparate eine specifische Erregung, jedem grosshiruniede bezirke eine specifische Function zu" (p. 281), the principle is accepted. As regards the "objectification" of sensations, the author joins the group which holds that externalization is finitive, and the reference to an ego derived. (P. 224.)

The results of the long and often heroic experimental study of the temperature sense (p. 246-339) which must, in the outset, be recognized as very unequal in scientific worth, are categorically as follows:

The temperature sense is one as regards modality, heat and cold being the two qualities of one and the same sense. There are no hot and cold spots. There is but one kind of end apparatus, and this can be acted upon by only one kind of stimulus. Weak to moderate temperatures cause pleasurable feeling; extreme or intermittent ones, harmful feeling; continuous stimuli give sensation of fluctuating intensity. Of several successive stimuli, the first are felt moderately in comparison with following ones; but still later stimuli are felt less strongly again. D. assumes that the time which elapses between the feeling of heat or cold and the feeling of pain, when extreme temperatures are applied, is a measure of the intensity of the temperature sensation, and repeatedly makes use of this assumption in his proofs. Stimulation of a sensory nerve by heat, cold (263), pressure, or electricity (266) causes no sensations of heat or cold; or if the last-named causes such sensations, this is to be explained by vaso-motor modifications and not by the customary theory of specific energy. (P. 269.)

Probably the "free endings" in the lower layers of the epidermis are the end organs of the temperature sense, though this is not proved. (P. 280.) The lower part of the œsophagus, the stomach, the mucous membrane of the regio respiratioria, etc., are insensible to temperature stimuli, and afford means of determining the temperature end organs by comparative histological examination. (Pp. 275-280.) The Gyr. sigm. is the cerebral centre for temperature sensations. (P. 283.) In six pathological cases, the quality and degree of temperature sensations were recognized, but not their location (p. 284). There is no proof of distinct hot and cold nerves, and the "beautiful hypotheses" of different resistances in the different fibres are "built upon the sand." (P. 285.) Burn wounds are sensitive to temperature or not according as lower layers are present or not. (P. 287.) Long continued heat or cold reduces sensibility. Galvanic electricity does not affect it. Kal. brom. and chloral hydrate taken internally increase—cognac and caffeine first increase, then decrease temperature sensibility. External application of five per cent. solution of cocaini mur. to mucous membrane made the part anæsthetic for pressure and pain without affecting temperature sensibility; while a twenty per cent. solution applied to the skin produced no effect; .005 grm. of a ten per cent.

solution of the same, injected subcutaneously, produced anæsthesia for temperature, later for contact, touch, electricity, pain and rendered "a small elliptical outer zone" hypersensitive for all these stimuli. Similar results were obtained with .015 grm. morphini hydrochlor. (P. 288.)

Mustard plaster produces hyperalgesic and reduces temperature sensibility. The result of Adamkiewicz, that sensibility for touch and pain is increased at the place of stimulations by mustard plaster and decreased on the corresponding part of the other side of the body, and that no such bilateral transfer of effects occurs in the case of temperature sensibility, is not tested, but is rejected by the author.

The median line of the body is less sensitive than either side, the right side than the left. The dorsal has a lower threshold, but a less fine discrimination than the volar. Discriminative sensibility is greatest on the back of the upper arm, least in the middle of the back; is not much affected by the normal temperature of the skin; stands in no clear relation to the thickness of the skin; varies within smaller limits than the sensibility for pressure and distance in different parts of the body and does not have its maxima and minima at the same places as the pressure and space senses (p. 293). The points at which temperature sensations pass into pain are from +48.7° C. to +58.6° C. for heat and from +2.5° C. to +4.1° C. for cold, according to the duration of stimulus and the part of the body affected. (P. 294.) Temperature stimuli are recognized as distinct at from 1.2 mm. to 6 mm., according to part of body. Increase of the surface stimulated increases the intensity of the sensation. Discrimination is best between 27° and 32° C. After-images are removed by the opposite stimulus and reinforced by repetition of the same stimulus. Weak stimuli give intermittent after-images. The continuous after-image of a strong stimulus lasts from 316 to 715 σ; for high degrees of temperature, producing pain, 1513 to 1,889 σ. Long continued stimulation wearies; brief stimulation refines sensibility for the opposite stimulus. Successive contrast is stronger than simultaneous. Successive and simultaneous contrasts supplement each other. A more intense stimulus may be replaced by a less intense stimulus applied to a greater surface.

As between minimal temperature (p. 303) stimuli and minimal contact stimuli, one may be in doubt which has been applied, but this does not prove that touch and temperature sensations are homogeneous. Cold objects feel heavier than warm, one to two and five-tenths grams having been added to the warmer of two thalers to make their weights seem equal. Cooling a part of the skin increases its sensibility for pressure stimuli. (P. 306.) For the determination of reaction time, the author devised a modified form of the Siemens-Pflüyer Fall Hammer, a "Finger-Contact" and a "Reizapparat" permitting variation of the intensity of stimulus and surface touched. (Pp. 306-311.) The author cannot report whether he and his subjects used the sensory or muscular reaction, because none of the gentlemen made the distinction. "The true reaction stands in the middle of these artificially developed extremes. (P. 312.) Reaction time for touch decreases with the increase of the surface touched and varies for different parts of the body; the point of the index finger having the longest; the neck and left cheek, the shortest reaction time, of several places examined. (P. 316.) Reaction time for temperature varies with the part of the body and the extent of surface touched; 215 to 951 σ time elapses between the sensation of contact and the sensation of cold when a drop of water is permitted to fall on the point of pulsation of the left radial

artery, the time increasing with the rise of temperature. (—10° to +20° C.) (P. 318.) A "preparation time" of two seconds is most favorable. (P. 322.) The topography of the temperature sense as regards reaction time, as given by Goldscheider (p. 317), is correct. The temperature reaction times as given by Goldscheider, Tanzi and Herzen (350 σ—750 σ for heat, 250 σ—600 σ for cold), are agreed to, while the much shorter times found by Vintsbgan are discredited.

As to the processes in the nervous system accompanying temperature sensations, the author rejects Lotze's "Oscillations," the Fick-Wunderli hypothesis that temperature and other skin sensations arise from different combinations of the same elements, the Blix-Donaldson-Goldscheider theory of hot and cold spots, and the Hering theory of assimilation and dissimilation. Instead of these, he awaits the "patient labor of long years."

In attacking more than a dozen theories in the field of the temperature sense, many of which have strong support, Dr. Dessoir shows very praiseworthy courage. Not so praiseworthy is the slight consideration or denial of facts alleged by men whose work is considered of the first order, when those facts stand in the way of the author's theses. For example, to facts alleged by Herzen (p. 281), and again to facts alleged by Adamkiewicz (p. 289), the author makes little other reply than that he does not believe them; and his explanations of facts, fundamentally controverting his own positions, reported by Blix, Donaldson, Goldscheider, Du Bois-Reymond, Rittes, Vintochgan and others, seem to an unprejudiced critic sometimes trivial, some times mutually contradictory, certainly inadequate.

All this is very sure to bring back upon the author a polemic as severe as his own. He will be the less able to meet counter attacks because of the serious inequality of his own work. For example, upon the critical question whether electrical stimulation of the sensory nerve causes peripheral temperature sensations, the author throws out 1017 of 1200 experiments, without giving any reason except that only the 183 retained were free from error (p. 268).

In page 300, experiments are reported in which the observer's auditory reaction is eliminated from the gross times obtained. This the author does by subtracting from the gross times the average reaction time given in Jastrow's Time Relations. This is so inexcusably bad that one wonders that the author thought it worth while to eliminate the observer's reaction time at all.

Of less importance are the objections to the author's special reaction time studies. His claim that the error in his sensibolometer is constant, when no guarantee is given as to the force and rate of its application, must be doubted. For the same reason doubt is cast upon the tests made with that instrument to determine the influence upon reaction time of the amount of surface stimulated (p. 313) and of the part of the body stimulated (p. 314).

On the other hand, the undoubted merits of this long and patient research will be recognized by every competent reader. The facts reported, as also the polemic which the author has mixed up with the report of facts instead of separating therefrom as one could have wished, will surely lead to a more general and thorough study of the questions involved.

W. L. BRYAN.

DERCUM, F. X., M. D. Note on a Chinese Brain. Journ. of Nervous and Mental Disease (New York), New Series, Vol. XVII. (Sept., 1892), 691-695.

Professor Dercum here presents his notes of an examination of "the brain of an adult Chinaman of the coolie class," comparing it with the only other Chinese brains treated scientifically, viz.: one by Mills and Parker in 1886, three by Moriz Benedikt in 1887, and two by Professor Dercum himself in 1889. He says in conclusion, "These brains, owing probably to the unusual sinuosity of some of the fissures, together with the excessive transverse fissuration, have a physiognomy, as it were, of their own. They certainly, in general appearance, look different from the average white brain that we handle, and very different from the brain of the negro."

A. F. CHAMBERLAIN.

THE LABORATORY OF THE PSYCHOLOGICAL INSTITUTE AT THE UNIVERSITY OF GÖTTINGEN.

By William O. Krohn, Ph. D.

This laboratory is in many respects the best for research work in all Germany. It is peculiar in that it owes its excellent equipment to a liberal gift from a private individual, the state giving but a mere pittance to its support. To the generosity of a former student and friend is Professor Müller indebted for the laboratory of which any university in any land might be justly proud. Not only is the apparatus entirely new, but it is exceedingly well constructed. The rooms so recently set aside by the curator of the University for this laboratory are so well adapted to the purpose of research and of such generous size that the old time objection of "limited space" can no longer be urged against the Psychological Laboratory at Göttingen. Besides a very large auditorium, they have three other large rooms, well fitted for different lines of research work, and a well aranged dark room—indeed this dark room is an ideal one. With the new commodious quarters and their carefully selected equipment, Professor Müller and Dr. Schumann are well equipped for guiding a large number of students in experimental work. Professor Müller's investigations are well known and Dr. Schumann has recently distinguished himself by some important pieces of work. He is also a skillful mechanical contriver and every one of the old standard pieces of apparatus in this laboratory (e. g., the control hammer) has undergone some improvement. He is a very ambitious man, and most worthy of the best success. He certainly has a remarkable future. Like Müller, he aims at accuracy and thoroughness rather than the accomplishing of a large amount of poorly done work.

There is also an interesting historical point connected with the Göttingen Laboratory. It is this: Professor Müller is the successor of the renowned Lotze, and it was Lotze who, in his lectures and published works, gave such an impetus to experimental and physiological psychology. How fitting, then, that there should be such a well equipped laboratory at Göttingen, realizing in a sense the long cherished hopes of the man who stood peerless among his contemporaries in the demand for thorough-going investigation and the application of the scientific method to all classes of facts.

The following is a descriptive list of the chief pieces of apparatus in the laboratory, arranged according to the kinds of experiment to which they are devoted.

I. *Psychometric and Reaction Time Researches.*

Hipp chronoscope (new pattern) with control hammer, the latter made by Krille. The whole construction embraces many new and ingenious improvements; also a device for the electro-magnetic